

Claims:

1. A focusing method used in a unit for forming a master of a data recording medium, in which recording light which is modulated in accordance with information to be recorded is converged through an objective lens which is focusing-controlled such that a distance from a recording medium, in which a photosensitive material film is applied to a surface of a base, remains constant, and information is recorded on said recording medium,

characterized in that focusing control of said objective lens is executed to a state that the position of a focal point of said objective lens has shifted a predetermined fine distance which is smaller than a film thickness of said photosensitive material film, in the direction of thickness, toward inside from a surface of said photosensitive material film.

2. A focusing method in accordance with claim 1, wherein said predetermined fine distance has a value which is in the range of approximately  $1/3$  to  $2/3$  of the film thickness of said photosensitive material film.

3. A focusing method in accordance with claim 1, wherein said predetermined fine distance has a value which is approximately  $1/2$  of the film thickness of said photosensitive material film.

4. A focusing method in accordance with claim 1, wherein feedback control is performed using different light whose

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wavelength is longer than that of said recording light such that a distance between said objective lens and said recording medium remains constant, a discrepancy of the distance between said objective lens and said recording medium from a desirable distance is detected using reflected light which is generated as said recording medium reflects said recording light, and a control target position for said feedback control is corrected based on said detected discrepancy such that the distance between said objective lens and said recording medium becomes said desirable distance, whereby said objective lens is focusing-controlled.

5. A focusing method used in a unit for forming a master of a data recording medium, in which recording light which is modulated in accordance with information to be recorded is converged through an objective lens which is focusing-controlled such that a distance from a recording medium remains constant, and information is recorded on said recording medium,

characterized in that feedback control is performed using different light whose wavelength is longer than that of said recording light such that a distance between said objective lens and said recording medium remains constant, a discrepancy of the distance between said objective lens and said recording medium from a desirable distance is detected using reflected light which is generated as said recording medium reflects said recording light, and a control target position for said feedback

control is corrected based on said detected discrepancy such that the distance between said objective lens and said recording medium becomes said desirable distance.

6. A method of detecting a deviation of a focal point position, characterized in that based on an intensity distribution of reflected light which is generated as a recording medium reflects, through an objective lens, recording light which is modulated in accordance with information to be recorded, a discrepancy of a distance between said objective lens and said recording medium from a desirable distance is detected.

7. A method of detecting a deviation of a focal point position in accordance with claim 6, wherein the intensity distribution of said reflected light is an intensity distribution of a spot of said reflected light which is projected on a light receiving surface which is arranged confocal with respect to said recording medium, and based on an intensity at the center inside said spot and a distance between the center of said spot and a point at which an intensity of a diffraction ring is maximum, said discrepancy of the distance between said objective lens and said recording medium from said desirable distance is detected.

8. A method of detecting a deviation of a focal point position in accordance with claim 6, wherein the intensity distribution of said reflected light is an intensity distribution of a spot of said reflected light which is projected on a light

receiving surface which is arranged confocal with respect to said recording medium, and based on an intensity at the center inside said spot and an intensity of a diffraction ring of said spot, said discrepancy of the distance between said objective lens and said recording medium from said desirable distance is detected.

9. A method of forming a master of a data recording medium, in which recording light which is modulated in accordance with information to be recorded is converged through an objective lens which is focusing-controlled such that a distance from a recording medium remains constant, and information is recorded on said recording medium,

characterized in that focusing control of said objective lens is executed to a state that the position of a focal point of said objective lens has shifted a predetermined fine distance which is smaller than a film thickness of a photosensitive material film, in the direction of thickness, toward inside from a surface of said photosensitive material film.

10. A method of forming a master of a data recording medium in accordance with claim 9, wherein said predetermined fine distance has a value which is in the range of approximately  $1/3$  to  $2/3$  of the film thickness of said photosensitive material film.

11. A method of forming a master of a data recording medium in accordance with claim 9, wherein said predetermined fine

distance has a value which is approximately  $1/2$  of the film thickness of said photosensitive material film.

12. A method of forming a master of a data recording medium in accordance with claim 9, wherein feedback control for maintaining a distance between said objective lens and said recording medium constant is performed using different light whose wavelength is longer than that of said recording light, a discrepancy of the distance between said objective lens and said recording medium from a desirable distance is detected using reflected light which is generated as said recording medium reflects said recording light, and a control target position for said feedback control is corrected based on said detected discrepancy such that the distance between said objective lens and said recording medium becomes said desirable distance, whereby said objective lens is focusing-controlled.

13. A method of forming a master of a data recording medium, in which recording light which is modulated in accordance with information to be recorded is converged through an objective lens which is focusing-controlled such that a distance from a recording medium remains constant, and information is recorded on said recording medium,

characterized in that feedback control is performed using different light whose wavelength is longer than that of said recording light such that a distance between said objective lens and said recording medium remains constant, a discrepancy of

the distance between said objective lens and said recording medium from a desirable distance is detected using reflected light which is generated as said recording medium reflects said recording light, and a control target position for said feedback control is corrected based on said detected discrepancy such that the distance between said objective lens and said recording medium becomes said desirable distance.

14. A focusing control unit used in a unit for forming a master of a data recording medium, in which recording light which is modulated in accordance with information to be recorded is converged through an objective lens which is focusing-controlled such that a distance from a recording medium remains constant, and information is recorded on said recording medium,

characterized in comprising focusing control means which focusing-controls said objective lens to a state that the position of a focal point of said objective lens has shifted a predetermined fine distance which is smaller than a film thickness of a photosensitive material film in the direction of thickness toward inside from a surface of said photosensitive material film.

15. A focusing control unit in accordance with claim 14, wherein said predetermined fine distance has a value which is in the range of approximately  $1/3$  to  $2/3$  of the film thickness of said photosensitive material film.

16. A focusing control unit in accordance with claim 14, wherein said predetermined fine distance has a value which is approximately 1/2 of the film thickness of said photosensitive material film.

17. A focusing control unit in accordance with claim 14, wherein said focusing control means comprises:

feedback control means which maintains a distance between said objective lens and said recording medium constant using different light whose wavelength is longer than that of said recording light;

position detecting means which detects a discrepancy of the distance between said objective lens and said recording medium from a desirable distance using reflected light which is generated as said recording medium reflects said recording light; and

control position correcting means which corrects a control target position of said feedback control means such that the distance between said objective lens and said recording medium becomes said desirable distance based on said discrepancy which is detected by said position detecting means.

18. A focusing control unit used in a unit for forming a master of a data recording medium, in which recording light which is modulated in accordance with information to be recorded is converged through an objective lens which is focusing-controlled such that a distance from a recording medium

remains constant, and information is recorded on said recording medium,

characterized in comprising:

feedback control means which maintains a distance between said objective lens and said recording medium constant using different light whose wavelength is longer than that of said recording light;

position detecting means which detects a discrepancy of the distance between said objective lens and said recording medium from a desirable distance using reflected light which is generated as said recording medium reflects said recording light; and

control position correcting means which corrects a control target position of said feedback control means such that the distance between said objective lens and said recording medium becomes said desirable distance based on said discrepancy which is detected by said position detecting means.

19. A focal point deviation detecting unit comprising light receiving means which detects an intensity distribution of light which impinges upon a light receiving surface and judgement means which judges the intensity distribution of said light which is detected by said light receiving means,

characterized in that said light receiving means detects an intensity distribution of reflected light which is generated as a recording medium reflects through an objective lens



recording light which is modulated in accordance with information to be recorded, and said judgement means judges the intensity distribution of said reflected light which is detected, whereby a discrepancy of the distance between said objective lens and said recording medium from a desirable distance is detected.

20. A focal point deviation detecting unit in accordance with claim 19, wherein a light receiving surface of said light receiving means is arranged confocal with respect to said recording medium, an intensity distribution of a spot of said reflected light which is projected on said light receiving surface is detected as the intensity distribution of said reflected light, said judgement means judges an intensity at the center inside said spot and a distance between the center of said spot and a point at which an intensity of a diffraction ring is maximum to thereby detect said discrepancy of the distance between said objective lens and said recording medium from said desirable distance.

21. A focal point deviation detecting unit in accordance with claim 19, wherein a light receiving surface of said light receiving means is arranged confocal with respect to said recording medium, an intensity distribution of a spot of said reflected light which is projected on said light receiving surface is detected as said intensity distribution of said reflected light, said judgement means judges an intensity at the center inside said spot and an intensity of a diffraction

ring of said spot to thereby detect said discrepancy of the distance between said objective lens and said recording medium from said desirable distance.

22. A unit for forming a master of a data recording medium, in which recording light which is modulated in accordance with information to be recorded is converged through an objective lens which is focusing-controlled such that a distance from a recording medium remains constant, and information is recorded on said recording medium,

characterized in comprising focusing control means which focusing-controls said objective lens to a state that the position of a focal point of said objective lens has shifted a predetermined fine distance which is smaller than a film thickness of a photosensitive material film in the direction of thickness toward inside from a surface of said photosensitive material film.

23. A unit for forming a master of a data recording medium in accordance with claim 22, wherein said predetermined fine distance has a value which is in the range of approximately  $1/3$  to  $2/3$  of the film thickness of said photosensitive material film.

24. A unit for forming a master of a data recording medium in accordance with claim 22, wherein said predetermined fine distance has a value which is approximately  $1/2$  of the film thickness of said photosensitive material film.

25. A unit for forming a master of a data recording medium in accordance with claim 22, wherein said focusing control means comprises:

feedback control means which maintains a distance between said objective lens and said recording medium constant using different light whose wavelength is longer than that of said recording light;

position detecting means which detects a discrepancy of the distance between said objective lens and said recording medium from a desirable distance using reflected light which is generated as said recording medium reflects said recording light; and

control position correcting means which corrects a control target position of said feedback control means such that the distance between said objective lens and said recording medium becomes said desirable distance based on said discrepancy which is detected by said position detecting means.

26. A unit for forming a master of a data recording medium, in which recording light which is modulated in accordance with information to be recorded is converged through an objective lens which is focusing-controlled such that a distance from a recording medium remains constant, and information is recorded on said recording medium,

characterized in comprising:

feedback control means which maintains a distance between

said objective lens and said recording medium constant using different light whose wavelength is longer than that of said recording light;

position detecting means which detects a discrepancy of the distance between said objective lens and said recording medium from a desirable distance using reflected light which is generated as said recording medium reflects said recording light; and

control position correcting means which corrects a control target position of said feedback control means such that the distance between said objective lens and said recording medium becomes said desirable distance based on said discrepancy which is detected by said position detecting means.